CLAIMS

The invention claimed is:

1. A heat spreader construction comprising:

a base portion having a heat spreading surface comprising a heat-receiving region and a perimeter surface surrounding the heat-receiving region, the base portion comprising a first material; and

a frame portion comprising a second material and interfacing the perimeter surface, the frame portion having a thickness and having an opening traversing the thickness, the second material comprising at least one member selected from the group consisting of aluminum, aluminum alloys, composite carbon materials, diamond, ceramic materials, molybdenum, tungsten, KOVAR®, and heat-stable polymer materials.

2. The heat spreader construction of claim 1 wherein the first material comprises at least one member of the group consisting of copper, copper alloys, aluminum, aluminum alloys, composite carbon-carbon materials, SiC, carbon, graphite, diamond, diamond composite materials, and combinations thereof.

3. A heat spreader construction comprising:

a base portion having a heat spreading surface comprising a heat-receiving region and a perimeter surface surrounding the heat-receiving region, the base portion comprising a first material;

a metallic coating over at least a portion of the heat spreading surface; and

a frame portion comprising a second material and interfacing the perimeter surface, the frame portion having a thickness and having an opening traversing the thickness, the second material comprising at least one member of the group consisting of copper, copper alloys, aluminum, aluminum alloys, composite carbon materials, diamond, ceramic materials, molybdenum, tungsten, KOVAR®, and heat-stable polymer materials.

4. The heat spreader construction of claim 1 further comprising an interface material disposed between the frame portion and the base portion.

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5. The heat spreader construction of claim 4 wherein the interface material comprises a member of the group consisting of an adhesive material and a solder material.

6. The heat spreader construction of claim 1 wherein the first material has a thermal conductivity of greater than 300 W/mk.

7. The heat spreader construction of claim 1 wherein the first material has a thermal conductivity of greater than 400 W/mk.

8. The heat spreader construction of claim 1 wherein the first material has a coefficient of thermal expansion of less than 9 ppm/K.

9. The heat spreader construction of claim 1 wherein the first material has a coefficient of thermal expansion of less than 6 ppm/K.

10. The heat spreader construction of claim 1 wherein the frame portion is in direct physical contact with the base portion.

11. The heat spreader construction of claim 10 wherein the base portion and the frame portion are joined by a diffusion bond.

12. The heat spreader construction of claim 1 further comprising a coating material over at least a portion of the heat spreading surface.

13. The heat spreader construction of claim 1 further comprising a coating material over at least a portion of the perimeter surface.

14. The heat spreader construction of claim 13 wherein the coating material is a metallic material.

15. A method of forming a heat spreader construction, comprising:

forming a base portion comprising a first material and having a first surface comprising a perimeter region surrounding a heat-receiving surface;

forming a frame portion comprising a second material; and

joining the base portion and the frame portion to form an independent heat spreader construction for subsequent incorporation into an integrated circuitry constructions.

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16. The method of claim 15 wherein the joining comprises attaching the frame portion and the perimeter region, the attaching comprising at least one of soldering, diffusion bonding and application of an adhesive material.

17. The heat spreader construction of claim 15 wherein the first material comprises at least one member of the group consisting of copper, copper alloys, aluminum, aluminum alloys, composite carbon-carbon materials and diamond.

18. The heat spreader construction of claim 15 wherein the second material comprises at least one member of the group consisting of copper, copper alloys, aluminum, aluminum alloys, composite carbon materials, diamond, ceramic materials, molybdenum, tungsten and KOVAR®.

19. The method of claim 15 further comprising applying a metallic coating material over at least a portion of the first surface prior to the joining.

20. Integrated circuitry comprising:

a heat-generating device; and

a heat spreader construction in thermal communication with the heat-generating device, the heat spreader construction comprising:

a base portion having a heat spreading surface disposed in heat-receiving relation relative to the heat-generating device, the base portion having a perimeter surface surrounding the heat spreading surface; and

a frame portion interfacing the perimeter surface, the frame portion having a thickness and having an opening traversing the thickness, the frame portion comprising at least one material selected from the group consisting of aluminum, aluminum alloys, composite carbon materials, diamond, ceramic materials, molybdenum, tungsten, KOVAR®, and heat-stable polymer materials.

21. The integrated circuitry of claim 20 wherein the heat-generating device is a flip-chip.

22. The integrated circuitry of claim 20 further comprising a circuitry board, wherein the heat spreader is mounted to the circuitry board with an interface material comprising at least one of an adhesive and a solder.

23. The integrated circuitry of claim 20 further comprising an interface material disposed between the heat-generating device and the heat spreading surface.

24. The integrated circuitry of claim 20 further comprising a heat-sink in thermal communication with the heat spreader.

25. A method of forming integrated circuitry comprising:

providing an integrated circuitry board having a heat-generating device mounted thereon;

after providing the integrated circuitry board, mounting an independently formed heat spreader in thermal communication with the heat-generating device, the heat spreader comprising:

a base portion comprising a first material, the base portion having a heat-receiving surface and a perimeter region around the heat-receiving surface; and

a frame portion comprising a second material interfacing the perimeter region.

26. The method of claim 25 further comprising mounting the heat-spreader to the circuitry board utilizing at least one of an adhesive and a solder.

27. The method of claim 25 wherein the heat-generating device is a flip-chip.

28. The method of claim 25 further comprising providing a thermal interface material between the heat-generating device and the heat-receiving surface, the thermal interface material being selected from the group consisting of thermal grease, metallic thermal interface materials, phase-change materials, thermal gels, and indium alloys.

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